

A NEW *LEUCOPHYLLUM* (SCROPHULARIACEAE) FROM SONORA, MEXICO

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ABSTRACT

A new species, *Leucophyllum mojinense*, is described from oak woodlands northeast of Álamos, Sonora, Mexico, in a habitat unlike that of the other desertic-scrub-chaparral species. Commensurately the species is distinguished by a more open, non-thorny branching, much larger leaves, flowers and fruit. In these features it is unlike all other species in the genus.

RESUMEN

Se describe una especie nueva para la ciencia, *Leucophyllum mojinense*, proveniente de los bosques de encino al noreste de Álamos, Sonora, México, en un hábitat diferente al de matorral desértico o de chaparral de las demás especies del género. Dado este hábitat menos xerofítico, no es sorprendente que la especie nueva se distinga fuertemente de las demás por su ramificación más abierta y no espinosa, y por sus hojas, flores y frutos mucho más grandes.

INTRODUCTION

Collections from near Álamos, Sonora, Mexico has revealed a distinctive new species of *Leucophyllum*. It is similar to other *Leucophyllum* species in all critical features, e.g., in having exstipulate leaves, dendritic vegetative vestiture, ebracteate flowers with separate sepals, didynamous stamens, partially adnate filaments, anthers with parallel anther sacs with the outermost sac connected across the anther tip, and sympetalous, funnellform, weakly zygomorphic, blue-purple corollas that are orange spotted on the throat floor and pilose within.

All other species of *Leucophyllum* occur in habitats marginal to and above deserts, (in mixed desert scrub, yucca woodland, izotal, thorn scrub) from trans-Pecos, central and southeastern Texas southward through east and central Mexico to Oaxaca (Henrickson & Flyr 1985). However, the new taxon occurs far to the west in a seasonally more mesic, usually frost-free oak woodland on the west slopes of the Sierra Madre Occidental in southeastern Sonora (Martin et al. 1998). And while all other species of *Leucophyllum* are strongly branched, sometimes thorny shrubs with small leaves, the new species is sparsely, more openly branched, with thicker young stems, larger leaves, flowers and fruit, all features showing adaptation to this novel, more mesic habitat.

DESCRIPTION

Leucophyllum mojinense Henrickson & T.R. Van Devender, sp. nov. (**Figs. 1, 2**). TYPE: MEXICO. SONORA: Mpio. Álamos, mesas above Arroyo Hondo, ca. 7.0 km below (SW of) Rancho Santa Bárbara, Rancho Ecológico Monte Mojino, 33 (road) km ENE of Álamos, uncommon shrub, 1 m tall, flowers purple, oak woodland, 27°05'58"N, 108°44'06"W, 1200 m, Mar 2009, D. Saucedo & S. A. Meyer s.n. (HOLOTYPE: ARIZ; ISOTYPES: MEXU, TEX, USON).

Species haec ab speciebus aliis *Leucophyllo* differt in ramificatione magis apertis caulibus ad 3–5 mm in diametro, foliorum ellipticibus grandioribus 25–56 mm longis atque 11–38 mm latis, corollas longioribus 35–40 mm per totam longitudinem cum pilis dendriticis, cellulis inflatis parietibus tenuibus supra epidermidem elevatis, et capsulis grandioribus ad 8 mm longis.

Coarsely branched shrubs to 10+ dm tall; stems mostly erect-ascending, branched from near base, less so above; young stems ± 2 mm diameter, terete, white pannose with dense, appressed, thin-walled, branched hairs; older stems 3–5 mm diameter, with vestiture tardily diminished; basal stems to 1.4 cm diameter, periderm gray to dark gray; internodes 2–9 mm long. Leaves alternate, subopposite, rarely some opposite, erect-ascending, thickish, elliptical, broadly elliptical to obovate, ovate in sucker shoots, (25–)32–56 mm long, 11–22(–38) mm wide, acute to obtuse-rounded, abruptly apiculate at the tips, narrowly cuneate above



FIG. 1. *Leucophyllum mojinense*. A. Photo of flowering branch, with an oblique view of an open flower as seen from below and forward. The abaxial petal shows a well developed pilose vestiture; also shown are mature elliptical, leaves. Background plant is the same species showing stems and leaves. B. Same flower (lateral view) showing tube and flaring of petal lobes, note open fruit below flower. C. Leaves of a sucker shoot at plant base showing larger, more ovate leaves and white vestiture. A.–B. $\pm \times 0.7$; C. $\pm \times 0.5$. A.–B. photos by M.G. Figueroa-Martínez, Jul 2005; C. by G.M. Gienger, 22 Aug 2007.

decurrently winged petioles 4–5(–10) mm long at the bases, entire, isobilateral, the surfaces of young leaves \pm silvery white pannose with a moderate vestiture of irregular, dendritically branched, multicellular hairs, the upper hair segments thin walled, expanded, mostly paralleling epidermis, elevated above the leaf surface by short, vertical basal segments, the vestiture diminishing in older leaves; midveins conspicuously raised, white beneath, impressed to narrowly grooved on the adaxial surface and this groove continuing down petiole, the axil of each leaf developing a densely pannose, short-stalked flower bud 4.5–7+ mm long. Flowers

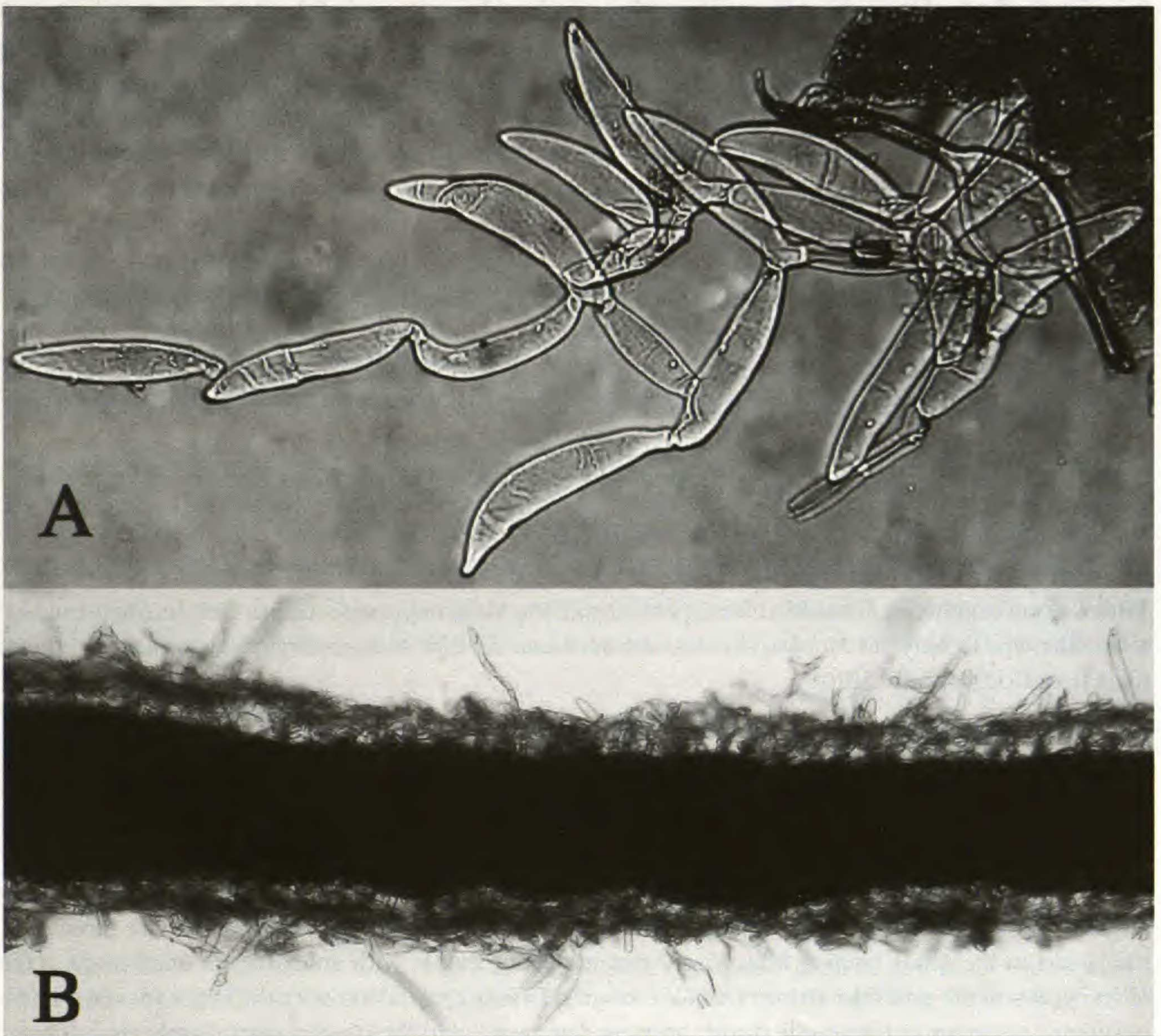


FIG. 2. *Leucophyllum mojinense* vestiture. A. Mass of distally branched, horizontally oriented cells of leaf trichomes. The individual cells range from 100–160 μm in length. B. Cross section of leaf blade ($\pm 1/3$ mm thick) showing erect basal cells of trichomes (± 14 –20 μm tall) upon which the distal cells lay horizontally.

solitary, axillary; pedicels 2–5 mm long, 1–1.2 mm wide, pannose; calyx 9–11 mm long; sepals 5, lanceolate, 6–11 mm long, to 2.5–3 mm wide above the thickened base, the outer sepals \pm broader than the inner, thick keeled, tapered to thickish, obtuse to acute tips, \pm pannose-floccose outside, stipitate glandular inside, the inner sepals with shaggy matted marginal hairs to 1 mm long, the sepals straight and persisting around fruit. Corollas ascending, 35–40 mm long, the basal tube (that enclosed in the calyx) 6–7 mm long, \pm 4–5 mm diameter, thickened, narrowly invaginated where adnate to filament bases, expanding above sepals to a broadly, slightly ampliate throat 18–22 mm long, to 8–11 mm in diameter, the 5 lobes rounded, 9–12 mm long, 9–10 mm wide, entire, rounded or the abaxial most minutely apiculate at the tip, spreading-upcurved (2 adaxial, 2 lateral and one abaxial), glabrous except where pilose with unicellular hairs to 2 mm long, 0.1 mm wide on the abaxial lobe and distal-mid tube-throat within, the tube whitish, striped with blue-purple outside, with rows of orange spots on the mid-basal, abaxial corolla throat within, the lobes stronger blue-purple; stamens 4, included, didynamous, (the adaxial-most, fifth stamen absent); adaxial (posterior-lateral) paired filaments 18–21 mm long, adnate to corolla tube base for 10–11.5 mm, the free filaments 8–10 mm

long $\pm 1.3 \times 0.7$ mm thick, positioning the introrse anther along the roof of the corolla throat about 5–6 mm below the corolla lobes, the abaxial (anterior-lower) filaments 15–17 mm long, adnate to corolla tube base for 8–10 mm, the free filament 6–8 mm, ± 0.5 mm in diameter, positioning the introrse anthers at the base floor of the tube throat proximal to the other pair, the filaments white, glabrous; anthers cream white, anther sacs oblong, the adaxial pair 4.5–5 mm long, ± 1.2 mm in total width, the abaxial pair ± 2.5 mm long, 1–1.2 mm in total width, the anther sacs initially parallel, the outer sac continuous around the tip, the paired anther sacs diverging at anthesis, those of the adaxial stamens drying peltately explanate. Ovaries superior, weakly stipitate glandular near the tip; styles 19–21 mm long, glabrous, exerted well beyond the anthers; stigmas narrowly compressed lanceolate, 1.5–2.8 mm long, to 0.7 mm wide, acute, opening at anthesis, stigmatic along the margins. Fruit brownish, ligneous, broadly ovoid, ± 8 mm long, to 5–6 mm wide, acuminate, opening along 4 distal sutures; seeds numerous, yellowish-tan, irregularly angular by compression, blunt at the ends, 0.9–1 mm long, 0.4–0.5 mm wide, the surfaces with a fine hexagonal pattern. All flower measurements are from rehydrated herbarium material.

PARATYPES. All from the same population. **MEXICO. Sonora:** Mpio. de Álamos, Mesa above Arroyo Hondo, ca. 7.0 km below (SW) of Rancho Santa Bárbara, 33 km ENE of Álamos (by road); oak woodland, ca. 27°05'58"N, 108°44'06"W, 1200 m, 8 Sep 2005, M.G. Figueroa-Martínez s.n. (ARIZ, TEX); same location, 2 Oct 2006, M.G. Figueroa-Martínez s.n., (ARIZ); same location and date, A.L. Reina, G. 2006-1064, with T. R. Van Devender, M.A. Dimmitt, (ARIZ, TEX); same location, Aug 2007, G.M. Gienger s.n. (CAS, MO, NMC, USON).

With flowers in July (Figueroa-Martínez's photos) and late March (type collection); fruit in August to October. The type locality lies 21.5 km (by air), east-northeast (66.33°) of the central plaza in Álamos, Sonora (data from Google Earth, 2010).

DISCUSSION

Leucophyllum mojinense differs from other species of *Leucophyllum* in many features. Vegetatively it has a more open branching with prominent stems and large leaves (see the stems in the background of Fig. 1A). The stem and leaf vestiture consists of narrow-based, asymmetrically inflated cylindrical cells with very thin walls that often collapse to form a dense pannose vestiture on stems and a thinner vestiture on leaves (Fig. 2). In leaves the upper cells are horizontally suspended above broad, erect basal cells. The flowers are the largest in the genus ranging from 35–40 mm in overall length, with an extended, open throat. Like other species in the genus the stamens are didynamous, basally epipetalous, with the larger adaxial anthers positioned at the top of the corolla throat, opening downward, and the smaller abaxial anthers positioned at the base of the corolla throat, opening upward. But unlike other species the thickish basal corolla tube is deeply invaginated opposite the attachment of the filament bases. Also, the adaxial anthers are the largest in the genus and the style tip is narrowly lance-ovate.

Within *Leucophyllum*, the new species shares most characteristics with *L. hintonorum* Nesom, a species with cuneate-based leaves from gypsum habitats between Aramberri and Zaragoza, Nuevo León. But while *L. hintonorum* has moderately large leaves 20–35 mm long, and moderately large flowers 16–28 mm long with orange spots in the lower throat, it differs strongly in vestiture, growth habit, and habitat making any statement of true relationships tentative.

Etymology.—The specific epithet refers to the southern Sonora term for tropical deciduous forest, *monte mojino*, the dominant vegetation visible in the Río Cuchujaqui drainage below the type locality. *Mojino* refers to the reddish-grey color of the dry season forest. It also celebrates the name of the land where it grows, Rancho Ecológico Monte Mojino (REMM) and the efforts of Nature and Culture International, Inc. to preserve this threatened habitat.

The new species was discovered by Martín Gabriel Figueroa-Martínez on July 15, 2005 as part of a vegetation survey of the Rancho Santa Bárbara area at a site about 21 km and 66° east-northeast of Álamos in southern Sonora (Martin et al. 1998). This area is on the 6,000 hectare REMM owned by Nature and Culture International, Inc., a private non-profit organization based in San Diego, California. REMM was established in 2004 to protect tropical deciduous forest within the large (92,890 hectares) Área Protegida de Fauna and Flora Sierra de Álamos-Río Cuchujaqui.

Rancho Santa Bárbara is in a very interesting area on the western edge of the Sierra Madre Occidental. It is in the Río Cuchujaqui drainage, a major tributary of the Río Fuerte in Sinaloa. Tropical deciduous forest occurs along most of the elevational gradient in REMM from 350 m along the Cuchujaqui to 1500 m above Santa Bárbara. The type locality of *L. mojinense*, at 1200 m elevation, is in oak woodland just above tropical deciduous forest and below pine-oak forest. Two large populations are in same area on rocky poor soils referred to as *sabanías*. Associated species include *Quercus* spp., *Dodonaea viscosa*, *Agave bovicornuta*, *Lysiloma watsonii*, and *Ipomoea arborescens*. Darío Saucedo, who made the first collections of the taxon, noted that he has not seen the plant elsewhere in the Sierra Madre Occidental in this area in Sonora or in western Chihuahua (pers. comm. 2009 to Stephanie A. Meyer). The type of the new *Erigeron barbarendis* Nesom & T.R. Van Devender was from Arroyo Santa Bárbara 1.5 km west-northwest of the *L. mojinense* populations (Nesom & Van Devender 2007) and type locality of *Hesperaloe tenuifolia* G.D. Starr lies 1.7 km. south-southwest of the type locality of *L. mojinense* on Cerro Agujudo (Starr 1997).

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REFERENCES

- HENRICKSON, J. AND D. FLYR. 1985. Systematics of *Leucophyllum* and *Eremogeton* (Scrophulariaceae). *Sida* 11: 107–172.
- MARTIN, P.S., D.A. YETMAN, M. FISHBEIN, P. JENKINS, T.R. VAN DEVENDER, AND R.K. WILSON (EDS.). 1998. Gentry's Río Mayo plants. The Tropical Deciduous Forest & Environs of Northwest Mexico. University of Arizona Press, Tucson.
- NESOM, G.L. 1991. A new species of *Leucophyllum* (Scrophulariaceae) from Nuevo León, México. *Phytologia* 71:337–339.
- NESOM, G.L. AND T.R. VAN DEVENDER. 2007. A new species of *Erigeron* (Asteraceae: Astereae) from the Río Mayo Region of Sonora, Mexico. *Phytologia* 89:219–222.
- STARR, G.D. 1997. A revision of the genus *Hesperaloe* (Agavaceae). *Madroño* 44:282–296.